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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

October 1, 2002

REPLY TO THE ATTENTION OF
SR-6J

Alan Faust, Environmental Health & Safety
Solutia, Inc.
W.G. Krummrich Plant
500 Monsanto Avenue
Sauget, IL 62206-1198

RE: Comments on the Dead Creek
Engineering Evaluation/Cost Analysis
Sauget Area 1 Site
Sauget and Cahokia, Illinois

Dear Mr. Faust:

A review of Solutia's June 21, 2002, submittal of the Dead Creek Engineering Evaluation/Cost Analysis for the Sauget Area 1 Site has been conducted by the United States Environmental Protection Agency as well as the U.S. Army Corps of Engineers. These comments focused on Volume 1-Engineering Evaluation/Feasibility Study and Volume 3-Ecological Risk Assessment. As of the date of this letter, no comments have been received from either the Illinois Environmental Protection Agency, the Illinois Department of Natural Resources, or the U.S. Fish and Wildlife Service. If comments are received from either agency in the near future, they will be forwarded to you as soon as possible. Comments from all reviewing agencies are attached. Please submit a response to comments and/or corrected pages on or before November 1, 2002.

If you have any questions regarding the attached comments, please do not hesitate to contact me at 312/886-4592.

Sincerely,

Mike Ribordy
Remedial Project Manager
Superfund Division

Attachments

bcc: Record Center 2

cc: Thomas Martin, USEPA
Tim Gouger, USACE
Sandra Bron, Illinois EPA
Kevin de la Bruere, USFWS
Mike Henry, IDNR

ATTACHMENTS

Sauget Area 1, Sauget and Cahokia, Illinois
Dead Creek Final Remedy, Creek Bottom Soil
Engineering Evaluation/Cost Analysis
Volume 1 – Main Text
Document Date: June 21, 2002

FINAL REVIEW COMMENTS
Laramide Environmental, LLC
September 25, 2002

GENERAL COMMENTS

1. Significant portions of the main text of this document are based on Volume 3, the residual ecological risk assessment. Our comments on Volume 3 were provided in a separate document, and should be incorporated into the main text in the relevant sections.
2. Given the uncertainty related to the limited number of on-site site fish samples (1 for CSB, 1 for CSD, and 3 for BPL), averaging the calculated compound-specific BSAFs is not sufficient to characterize the range of uncertainty. Please provide results using the maximum BSAF as well as the average BSAF in the evaluation in order to assess the sensitivity to that parameter. Rationale should be provided for not using all 12 fish samples from the BPL in this analysis. This issue is described more extensively in our comments on Volume 3.
3. It is not clear whether the reference area samples were included in the averages. If they were, they should be removed.
4. No evaluation of potential leaching of contaminants from creek bottom soils to groundwater is presented. This was described in our suggested outline of report contents and discussed in conference calls prior to production of the Dead Creek EE/CA. Evaluation of potential leaching is particularly relevant for Site M, where impacted sediments were apparently left in place and covered by clean fill.
5. The proposed site-specific, risk-based sediment concentrations that were used to determine the need for additional remediation should be presented in the main text. The proposed site-specific, risk-based sediment concentrations for metals and DDT presented in Table 4-1 of the residual ecological risk assessment (Volume 3) are 1 to 2 orders of magnitude higher than consensus-based concentrations that are considered to be protective of aquatic life. The following table compares the proposed site-specific concentrations to the consensus values presented in MacDonald et al (2000):

Compound	Table 4-1 (Volume 3) Predicted Risk-based Sediment Concentration (mg/kg)	Consensus-based PEC for aquatic life (MacDonald et al, 2000) (mg/kg)
Copper	24,792	149
Lead	3,150	128
Mercury	No value	1.06
Zinc	4,739	459
Total PCBs	0.58	0.676
Total DDT	4.1	0.062
Total PAHs	No value	23

While the MacDonald et al (2000) values are not intended as absolute upper limits to potential risk-based sediment standards, insufficient rationale has been provided to support such a large departure from values that have been rigorously evaluated at other sites. In particular, no sensitivity analysis has been provided and inappropriately non-conservative parameters have been selected for food-chain modeling. The recommended analyses presented in our detailed comments on the residual ecological risk assessment (Volume 3) should be performed and the results summarized in the main text in order to justify the transects selected for further remedial action.

6. Mercury, dioxin (as TEQ) and total PAH site-specific, risk-based concentrations have not yet been proposed. As these compounds are known to be bioaccumulative, site-specific, risk-based concentrations should be evaluated in this EE/CA.

7. 1 part per million for total VOCs, total SVOCs, total pesticides, and total herbicides is used as a de facto screening concentration in many parts of the document. A concentration of 1000 ppm for metals is also used as a de facto screening value. In other parts of the document, values of 10 ppm for organics and 100 ppm for inorganics are used. Rationale for selection of these values rather than the site-specific, risk-based concentrations developed in Volume 3 should be provided.

SPECIFIC COMMENTS

8. *Page 1-1, Section 1.1*: The text in the introduction describes the requirements of the Unilateral Administrative Order (the Order). Among the requirements is the removal of materials from Site M. According to the text of the report, this was not done and Site M was backfilled with "clean fill." Rationale for not performing the work required by the Order should be provided. This comment also applies to Section 2.1.

9. *Page 1-1, Section 1.1*: The text of the Order also states that a membrane liner is to be placed over CS-B, and in all other areas where such a liner is determined to be necessary. However, only limited portions of CS-B are recommended for lining in later sections of the EE/CA. Rationale for modifying the requirements of the Order should be provided. This comment also applies to Section 2.1.

10. *Pages 1-6 to 1-7, Section 1.2.3, hydrology and hydrogeology*: The hydrologic interaction between Dead Creek and the shallow aquifer system should be described. This is particularly relevant to the design of a potential creek-bed liner and to the evaluation of potential impacts on Dead Creek by contaminated groundwater.

11. *Page 1-10. Sensitive Habitats*: Consistent with comments on the residual ERA (Volume 3), replace the text with the following paragraph:

    The Sauget 1 site lies within the flood plain area of the Mississippi River, referred to in this region as the American Bottom, one of the largest areas of flood plain along the Mississippi flyway. The American Bottom is important for migratory birds and other

wildlife for habitat and food resources and is currently threatened by habitat fragmentation. Within the American Bottom, Dead Creek is a primary tributary that provides drainage to the Mississippi. Dead Creek is also used by a variety of birds, mammals and invertebrates. Several federal and state listed species have been noted or could potentially use the habitat provided by Dead Creek and Borrow Pit Lake. Listed species noted at the site on a two-day survey in November 2000 include black-crowned night heron, brown creeper, and early wild rye. Bald eagles are also known to use the area.

This comment also applies to pages 2-22 to 2-23

12. *Pages 1-16 to 1-17, Section 1.4.3*: Contrary to the text in the final paragraph of Section 1.4.3, the presence of SVOCs above Class I standards at the sampling location adjacent to Site M indicates the potential for leaching of contaminants from sediments to groundwater. This text also states that "the removal of impacted sediments in Dead Creek Segments B, C, D, E, and F and Site M eliminated any future potential for migration by this route." Descriptions on page 1-18 and in Section 2, however, appear to indicate that impacted sediments were not removed from Site M, but were left in place and covered by 3 feet of "clean fill." The discrepancy between the described removal actions for Site M should be reconciled.

    If impacted sediments were left in place in Site M, the potential for future leaching from this source was not eliminated. The statement that this pathway was eliminated for the residual creek-bed soils is unsubstantiated by any scientific or technical evaluation and should be removed. The potential for leaching from soils or residual impacted sediments to groundwater should be quantitatively evaluated for all creek segments and Site M.. This was recommended in our suggested outline and in conference calls prior to production of this report.

13. *Page 1-17, first complete paragraph on page*: Replace the word "exposure" in the last sentence of this paragraph with "exposed."

14. *Pages 1-17 to 1-18, Section 1.4.4*: The portions of Dead Creek requiring lining or further corrective action may change depending on the results of the sensitivity analysis and the evaluation of mercury, dioxins, and total PAHs (see comments #2 and #6 above). This comment also applies to page 2-54.

15. *Page 1-18, Section 1.4.4, first full paragraph on page*: As discussed in comment #9 above, rationale should be provided for not lining all of CS-B as apparently required by the Order.

16. *Page 1-20, Section 1.5*: The acronyms "RME" and "MLE" should be defined. Both tables on this page are described as applying to a recreational teenager. The text should be checked and appropriate modifications made to include the evaluation of the construction worker. This comment also applies to pages 2-62 to 2-63.

17. *Page 1-21, Section 1.6, first paragraph*: The text states in part that impacted sediments in Site M were removed down to native soils. Elsewhere, Site M is described as having no excavation, with impacted soils covered by 3 feet of clean fill. This discrepancy should be resolved and the correct description for remedial action at Site M used throughout the document.

18. *Page 1-22, Section 1.6*: :This analysis should include maximum BSAF values in addition to the average BSAF values in order to evaluate the sensitivity of the results to that parameter (see comment #2 above and comments on Volume 3). If the regression-equation evaluation included the reference area fish samples, this evaluation should also be repeated with only the on-site samples. Finally, mercury should be evaluated because1999 sediment and fish concentrations both exceeded values known to pose ecological risk. The portions of Dead Creek requiring further corrective action may change depending on the results of these evaluations.

19. *Page 1-22, first full paragraph*: The purpose of sampling is to characterize a larger spatial area. Listing sediment samples that need to be isolated or removed to achieve a cleanup

goal is inappropriate. Presumably, these samples have already been removed and sent to the laboratory for analysis. It is the areas that the samples are supposed to represent that need to be isolated or removed and should be described. Please revise the text accordingly. This comment also applies to page 2-65.

20. *Page 1-23, Notes to preceding table*: Creek-channel width in CS-C is shown as 50 feet. However, CS-C is not proposed for further action. Please replace with the typical width assumed for CS-F. This comment also applies to page 2-65.

21. *Pages 1-26 to 1-27, Section 1.7.3*: Compliance with ARARS is described for the three alternatives. However, no ARARs are listed or described. ARARs for the Dead Creek EE/CA should be listed in order to evaluate compliance of the alternatives.

22. *Pages 2-12 through 2-14, hydrology and hydrogeology*: The interaction between groundwater and Dead Creek surface water should be described. See comment #10 above.

23. *Page 2-22, Sensitive Habitats*: See comment #11 above.

24. *Page 2-51, last paragraph*: The parenthetical reference to "Section 2.3.4 below" should be checked and corrected. The text on this page is within Section 2.3.4.

25. *Page 2-54 to 2-55, Site M*: The description of the removal action should be clarified to state whether any soils were removed from Site M or not (see comments #8, #12, and #17 above). The source of the "clean soil" used to backfill Site M should be described, along with any sampling and analyses performed to verify that the fill was indeed clean.

26. *Page 2-55, first full paragraph, third sentence:* The word "where" should be changed to "were" in this sentence. The revised sentence should read, "Total VOCs, Total SVOCs, Total Pesticides and Total Herbicides were detected at concentrations greater than 1 ppm..." (emphasis added for clarity).

27. *Page 2-55, last paragraph*: Because impacted soils were left in place and the available data indicates a potential for leaching to groundwater, we cannot agree that Site M "should pose no risk to public health and welfare." The potential for leaching from the impacted soils left in place to result in groundwater concentrations above relevant standards should be quantitatively evaluated as suggested in our recommended outline provided prior to the preparation of this document. See comment #12 above.

28. *Page 2-60, Nature and Extent of Soil Contamination*: Rationale should be provided for selecting the screening concentrations of 1 ppm total organics and 1000 ppm for zinc. The nature and extent of contamination should be determined by the site-specific, risk-based criteria developed in Volume 3, not arbitrary benchmarks.

29. *Page 2-63*: See comment #16 above.

30. *Page 2-64 to 2-65*: See comments #18, #19, and #20 above.

31. *Page 2-67, tabulated mercury values*: The tabulated summary of mercury concentrations in biota indicates ND for one CS-B sample, and 0.018 mg/kg for one CS-D sample. All other samples show as "NS," presumably meaning not sampled or not analyzed. The table at the bottom of the page is captioned "Average Mercury Concentrations in Sediment and Biota (Whole Body), mg/kg." The "average" value for biota in CS-B is listed as 0.042 mg/kg, and the "average" value for biota in CS-D is listed as 0.028 mg/kg. The discrepancy between the values shown in the "Average" table and the single values shown in the "Summary" table should be resolved. "Averaging" a single detected value, or a single non-detected value in the case of the sample from CS-B, has no statistical power. Conclusions drawn in the text on page 2-67 on the basis of these numbers are without basis and should be deleted. As discussed in comment #18 above and more extensively in our comments on Volume 3, mercury must be evaluated as part of the residual ERA for Dead Creek soils.

32. *Page 2-68, first paragraph*: The text describes the measured value of 0.6 mg/kg mercury in one fish sample as an outlier. With the limited data set available for fish tissue, it is not

possible to conclude that this is an outlier. In fact, a detected concentration of 0.6 mg/kg, above the screening level of 0.5 mg/kg, is significant with so few samples. The discussion of average values with or without this analysis should be deleted.

33. *Pages 2-68, second paragraph, through 2-70*: The discussion of additional mercury sampling in the Borrow Pit Lake sediments is not relevant to this EE/CA and should be deleted. A separate Mitigation Plan has been prepared by the PRPs to describe and implement this work. Comments previously provided on the Mitigation Plan are applicable to this discussion and should be incorporated into the text if it is not removed.

34. *Figure 2-23*: Units of measurement are listed as "ppq" in the legend, but the values posted on the figure appear to be in parts per million. This discrepancy should be resolved.

35. *Figure 2-28*: Addresses and/or sample location identifiers should be provided on the figure so that data in tables and discussions in the text can be referenced to the actual sample locations.

Sauget Area 1, Sauget and Cahokia, Illinois
Dead Creek Final Remedy, Creek Bottom Soil
Engineering Evaluation/Cost Analysis
Volume 3 – Ecological Risk Analysis
Document Date: June 21, 2002

FNAL REVIEW COMMENTS
Waterstone Environmental Hydrology and Engineering, Inc. and
Laramide Environmental, LLC
September 19, 2002

GENERAL COMMENTS

1. Given the uncertainty related to the limited number of on-site site fish samples (1 for CSB, 1 for CSD, and 3 for BPL), averaging the calculated compound-specific BSAFs is not sufficient to characterize the range of uncertainty. Please provide results using the maximum BSAF as well as the average BSAF in the evaluation in order to assess the sensitivity to that parameter.
2. It is not clear whether the reference area samples were included in the averages. If they were, they should be removed.
3. Given that the creek bottom soil sampling was conducted to provide data for a residual ERA, the first step should be screening the results against the initial sediment benchmarks and then conducting the food chain evaluation only on known bioaccumulative compounds. This was described and recommended in our suggested outline of report contents.
4. The proposed site-specific, risk-based sediment concentrations for metals and DDT presented in Table 5.1 are 1 to 2 orders of magnitude higher than consensus-based concentrations that are considered to be protective of aquatic life. The following table compares the proposed site-specific concentrations to the consensus values presented in MacDonald et al (2000):

Compound	Table 4-1 Predicted Risk-based Sediment Concentration (mg/kg)	Consensus-based PEC for aquatic life (MacDonald et al, 2000) (mg/kg)
Copper	24,792	149
Lead	3,150	128
Mercury	No value	1.06
Zinc	4,739	459
Total PCBs	0.58	0.676
Total DDT	4.1	0.062
Total PAHs	No value	23

While the MacDonald et al (2000) values are not intended as absolute upper limits to potential risk-based sediment standards, insufficient rationale has been provided to support such a large departure from values that have been rigorously evaluated at other sites. In particular, no sensitivity analysis has

been provided and inappropriately non-conservative parameters have been selected for food-chain modeling.

In order to evaluate the range of uncertainty in the analysis, the following information should be provided:

- The same analysis using the maximum BSAF instead of the average BSAF;
- Results of food-chain modeling with an area-use factor of 1; and
- Results of the analysis using the maximum creek-bottom soil concentrations in cases where the 95% UCL cannot be calculated due to limited data or high variance (i.e., Creek Sections C and D).

5. Mercury, dioxin (as TEQ) and total PAH site-specific, risk-based concentrations have not yet been proposed. As these compounds are known to be bioaccumulative, site-specific risk-based concentrations should be evaluated in this EE/CA.
6. No evaluation of potential leaching of contaminants from creek bottom soils to groundwater is presented. This was described in our suggested outline of report contents and discussed in conference calls prior to production of the residual ERA. Evaluation of potential leaching is particularly relevant for Site M, where impacted sediments were apparently left in place and covered by clean fill.

SPECIFIC COMMENTS

7. Page 2, Section 1.1, last paragraph, last sentence: Conclusions regarding the third assessment endpoint do not belong here unless conclusions for the other endpoints are also presented. Please remove this sentence.
8. Page 2, Section 1.2, first paragraph, last sentence: Please revise this sentence to read "...compared to the 95% UCL (or maximum) concentration in each creek section...". See General Comment #1.
9. Page 2, Section 1.2, second paragraph, second sentence: Add the following phrase at the end of this sentence: ", and compares the sediment concentrations to screening benchmarks and the surface water concentrations to surface water quality criteria."
10. Page 2, Section 1.2, second paragraph, fourth sentence: Samples, by definition, are representative of a larger area. Removing "sample locations" does not make sense. Revise this sentence (and Section 5.0) to describe sample exceedances that indicate the potential need for remediation in some areas of the creek. Indicate the length of creek bed represented by each sample location that would be subject to corrective action.
11. Page 3, Section 2.0, second paragraph, second sentence: Figure 1-1 shows that Borrow Pit Lake is approximately 5,280 feet in length and 600 feet wide. Please revise this sentence accordingly.

12. Page 3, Section 2.0, last sentence: Please insert the following before this sentence:

    The Sauget 1 site lies within the flood plain area of the Mississippi River, referred to in this region as the American Bottom, one of the largest areas of flood plain along the Mississippi flyway. The American Bottom is important for migratory birds and other wildlife for habitat and food resources and is currently threatened by habitat fragmentation. Within the American Bottom, Dead Creek is a primary tributary that provides drainage to the Mississippi. Dead Creek is also used by a variety of birds, mammals and invertebrates. Several federal and state listed species have been noted or could potentially use the habitat provided by Dead Creek and Borrow Pit Lake. Listed species noted at the site on a two-day survey in November 2000 include black-crowned night heron, brown creeper, and early wild rye. Although no longer listed, bald eagles are also known to use the area.

13. Page 5, Section 3.2, last sentence: At the end of this section, please include a list (or a table) of the chemicals that <u>are</u> evaluated further.

14. Page 9, Section 4.1.1, last paragraph, first sentence: Given the uncertainty related to the limited number of on-site site fish samples (1 for CSB, 1 for CSD, and 3 for BPL), the evaluation should include results using the maximum BSAF as well as the average BSAF. Please provide results using the maximum BSAF. See Comment #1 above.

15. Page 9, Section 4.1.2:This analysis should also include the maximum BSAF values (see previous comment). In addition, if the regression equation evaluation included the reference area fish samples, this evaluation should also be repeated with only the on-site samples. Rationale should be provided for not using all 12 BPL fish-tissue samples in the evaluation. Finally, mercury should be evaluated because1999 sediment and fish concentrations both exceeded values known to pose ecological risk. In Table 4-2 of this report, the fish whole body toxicity value used is 0.25 mg/kg. The BPL fish sample concentration is 0.6 mg/kg.

16. Page 11, Section 4.1.2.1, last paragraph: Given the uncertainty related to the limited number of on-site site fish samples (1 for CSB, 1 for CSD, and 3 for BPL), the fact that one of the BPL fish samples had a mercury concentration of 0.6 mg/kg is significant and worthy of further investigation. The fact that mercury was not detected in surface water is insignificant due to the volatility of methyl mercury.

17. Page 11, Section 4.1.3: In order to assess the sensitivity and range of potential values, please repeat this analysis using maximum BSAFs (see Comment #14) and linear regressions that do not include reference area fish samples.

18. Page 12, Section 4.2: In order to assess the sensitivity and range of potential values, please repeat this analysis using maximum BSAFs (see Comment #14) and linear regressions that do not include reference area fish samples.

19. Page 12, Section 4.2.1, last paragraph, first indented paragraph, last sentence: If a UCL cannot be calculated (too few samples), please use the maximum value for the exposure point concentration. This is consistent with standard practice.

20. Page 13, Section 4.2.1, first sentence: The area-use factors in the 2001 ERA appeared to be one. Please use an area-use factor of one in this analysis or explain how each creek segment was adjusted and the rationale behind that adjustment.

21. Page 14, Section 5.0: Given that the creek bottom soil sampling was conducted to provide data for a residual ERA, the first step should be screening the results against the initial sediment benchmarks and then conducting the food chain evaluation only on known bioaccumulative compounds.

22. Page 14, Section 5.0: As discussed in Comment #4 above, insufficient evaluation of the uncertainty and sensitivity of this analysis to parameter selections has been provided. Please repeat this analysis as follows:

    - Using maximum BSAFs (see Comment #14) and linear regressions that do not include reference area fish samples,
    - Using maximum exposure point concentrations if there are too few samples to calculate a 95% UCL, and
    - Using area use factors of one.

23. Page 14, Section 5.2, first paragraph: The purpose of sampling is to characterize a larger spatial area. Listing sediment "samples that have to be removed" to achieve a cleanup goal does not make sense. It is the areas that the samples are presumed to represent that need to be removed and that should be described.

24. Appendix B, Procedures: If less than 10 samples are available, please use the maximum value rather than averaging. This is standard practice to provide an appropriate substitute for the 95% UCL in cases when it cannot be calculated.